

# Synthesis and characterization of hydrophobic properties of silicon dioxide in palm oil based bio-coating

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## ABSTRACT

This research aims to synthesize a biobased polyurethane coating from epoxidized palm oil (EPO) and determine the effect of different silicon dioxide ( $\text{SiO}_2$ ) loadings on the hydrophobicity performance of the coating. In this work, EPO was firstly undergoing an acrylation reaction and followed by the addition of isophorone diisocyanate (IPDI) to form Polyurethane (PU). Improvement was made by adding  $\text{SiO}_2$  at different loadings into the palm oil-based PU to provide hydrophobic properties to the coating materials. The sample was characterized using Fourier Transform Infrared Spectroscopy (FTIR), water sliding angle test, and water absorption test. Based on the FTIR results, PU was successfully synthesized from EPO with  $\text{SiO}_2$  addition. The results also proved that the addition of  $\text{SiO}_2$  successfully improved the hydrophobicity of the coating. The higher the  $\text{SiO}_2$  content in palm oil PU, the shorter the time taken for the water to slide down the  $25^\circ$  angle coated glass and lower the water absorption percentage of the coating material. Based on the analysis, 3 phr  $\text{SiO}_2$  content showed the highest hydrophobicity performance, which could be applied in further research.

## KEYWORDS

Hydrophobic; Silicon dioxide; Palm Oil; Bio-coating

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